

REMARKS

Claims 12-26 are pending in the application. This Amendment amends claims 15-17 and 23-25. Claims 12 and 19 are independent.

The Drawing Objections

The drawings are objected to as failing to comply with 37 C.F.R. § 1.84(p)(5) because reference numeral 112 is not identified in the drawings.

This Amendment encloses New Sheet Figures 4 and 5 to clearly show the features of the original disclosure in the drawings, thereby obviating this objection. No new matter is added.

Applicants respectfully request withdrawal of this objection.

Claim Rejection under 35 U.S.C. § 112, first paragraph

Claims 12-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Particularly, the Office Action states that the Examiner can find no disclosure utilizing a "voltage amplitude" of a supply voltage as well as values being determined based on a voltage amplitude. The examiner can only find disclosure to the "voltage value" being used. Therefore, the recitation to "a voltage amplitude" is deemed new matter.

Applicants respectfully traverse this rejection.

M.P.E.P. § 2163.02 sets out the standard for complying with the written description requirement of 35 U.S.C. § 112, first paragraph:

"An objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed. [...] to satisfy the written description requirement, an applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention, and that the invention, in that context, is whatever is now claimed."

Whenever the issue arises, the fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed. [...] An applicant shows possession of the claimed invention by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams, and formulas that fully set forth the claimed invention.

Applicants respectfully submit that the original disclosure and figures convey with reasonable clarity to those skilled in the art that the features of claims 12-26 were in possession of the Applicants, as of the filing date. The features of claims 12-26 very clearly are supported by the original disclosure and therefore do not constitute new matter.

One of ordinary skill in the art would know and understand that the voltage value being referenced in the present application is the voltage amplitude or voltage magnitude of the supply voltage signal. Indeed, the voltage values V shown in Figure 3 very clearly are the amplitude or magnitude of the supply voltage signal.

With reference to Figure 1, the disclosure clearly explains that the control circuit 10 receives a voltage-measuring signal from a voltage meter circuit 12 connected parallel to the clamps 11. See, e.g., page 5, lines 19-24.

With reference to Figure 2, the disclosure clearly explains that to make the acquisition outcome of the measurement circuit 12 independent of the pulse-duty ratio of the circuit breakers 9, the measurement circuit 12 is connected to a diode 13 in series and to a condenser 14 in parallel, the result of which is that the peak value of one of the two half waves of the supply voltage rests constant on the voltage meter circuit 12. See, e.g., page 6, lines 12-19.

One of ordinary skill in the art would know and understand that the voltage value or the peak value being referenced in the present application is the voltage amplitude or voltage magnitude of the supply voltage signal. Indeed, the voltage values V shown in Figure 3 very clearly are the amplitude or magnitude of the voltage signal.

For at least these reasons, claims 12-26 clearly are supported by the original disclosure, and therefore, certainly comply with the written description requirement. Applicants respectfully request withdrawal of this rejection.

The Rejections under 35 U.S.C. § 112, second paragraph

The Office Action rejects claims 13-17 and 20-23 rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Particularly, the Office Action asserts that claims 13 and 20 recite the limitation "generating said pulse-duty ratio as a decreasing step function of said recorded amplitude voltage" and variations thereof. The Office Action alleges that it is unclear and uncertain to the examiner to what exact a "decreasing step function of the said recorded voltage amplitude" is and how it correlates to the generation of "said pulse-duty ratio. Therefore, the Office Action alleges that the recitation to limitation "generating said pulse-duty ratio as a decreasing step function of said recorded amplitude voltage" is deemed indefinite and further clarification is required.

Applicants respectfully traverse this rejection.

M.P.E.P. § 2173.02 sets out the standard for complying with 35 U.S.C. § 112, second paragraph:

The essential inquiry pertaining to the requirement under 35 U.S.C. § 112, second paragraph, is 'whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of: (A) the content of the particular application disclosure; (B) the teachings of the prior art; and (C) the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.'

Claim 13 recites generating said pulse-duty ratio as a decreasing step function of said recorded voltage amplitude. Claim 20 recites wherein said pulse-duty ratio is generated as a decreasing step function of said recorded voltage amplitude.

Applicants respectfully submit that claims 13 and 20 set out and circumscribe the particular subject matter with a reasonable degree of clarity and particularity such that one possessing the ordinary level of skill in the pertinent art at the time the invention was made would know and understand the subject matter of the claimed invention.

Moreover, the specification very clearly explains that the use of a step function corresponds to dividing the value range of the supply voltage into several intervals, whereby each interval is assigned one of the discrete values of the step function. To keep the width of fluctuation of the heat output in each interval approximately identical, the interval limits are preferably fixed such that upper and lower limit are in a ratio substantially the same for all intervals, preferably with a value between 1.1 and 1.2. See, e.g., page 3, lines 27-30; and page 4, lines 1-8.

Thus, claims 13 and 20 set out and circumscribe the particular subject matter with a reasonable degree of clarity and particularity such that one possessing the ordinary level of skill in the pertinent art at the time the invention was made would know and understand the subject matter of the claimed invention. Applicants respectfully request withdrawal of this rejection.

Regarding the rejection of claims 15 and 23 under 35 U.S.C. § 112, second paragraph, this Amendment amends these claims to particularly point out and distinctly claim the subject matter which applicant regards as the invention, thereby overcoming these rejections. Applicants respectfully request withdrawal of these rejections.

Regarding the rejection of claims 16, 17, 24 and 25 under 35 U.S.C. 112, second paragraph, as allegedly being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections, this Amendment amends these claims to particularly point out and distinctly claim the subject matter which applicant regards as the invention, thereby overcoming these rejections. Applicants respectfully submit that no essential elements are omitted in claims 16, 17, 24 and 25. Applicants respectfully request withdrawal of this rejection.

The Claimed Invention

An exemplary embodiment of the present invention as recited by, for example, independent claim 12, includes a method for operating a defroster heater that defrosts an evaporator of a refrigeration device. The method includes recording a voltage amplitude of a supply voltage for the defroster heater, generating a pulsed supply current for the defroster heater, a pulse-duty ratio of the pulsed supply current based upon the recorded voltage amplitude, and supplying the defroster heater with the pulsed supply current, for a fixed heating interval.

Another exemplary embodiment of the present invention as recited by, for example, independent claim 19, includes a refrigeration device, comprising an integrated defroster heater for defrosting an evaporator, a voltage supply coupled to said defroster heater, a recording circuit coupled to said voltage supply for recording a voltage amplitude supplied to said defroster heater and for generating a control signal having a pulse-duty ratio that is based upon the recorded voltage amplitude, and a circuit breaker activated by said control signal for pulsing a supply current fed to said defroster heater for a fixed heating interval.

Ice may form on an evaporator of a refrigerator. This ice has an insulating effect, so that exchange of cold between the evaporator and the cooling chamber is made difficult. For this reason, the ice must be thawed from time to time, for which purpose many refrigeration appliances, in particular so-called frost-free appliances, have defroster heating. See, e.g., page 1, lines 10-17.

Conventionally, such defroster heating is controlled, for example, by ice sensors such that the defrosting process is performed if a recorded quantity of ice exceeds a limit value, and discontinued if no more ice is detected. However, such ice sensors may be expensive and insufficiently reliable. Also, a large number of ice sensors may be necessary to reliably assess the total quantity of ice since the thickness of the ice can vary from place to place. Some conventional devices periodically control defrosting procedures with a fixed preset duration with the assistance of a time switch element, which generally is easy, cost-effective, and reliable. See, e.g., page 1, lines 19-31.

Furthermore, in conventional devices, either too much or too little heat supplied wherein there are fluctuations in voltage, since the heat output varies in proportion to the square of the supply voltage of the defroster heating. If there is too little heat, the defrosting procedure is often incomplete. On the other hand, if there is more heat than is actually necessary for defrosting, then the device causes unnecessary energy consumption. See, e.g., page 2, lines 5-18.

In stark contrast to the conventional devices, the present invention controls a defrost heater with a pulsed supply current having a pulse-duty ratio that is based upon an amplitude of the defroster heater supply voltage. In this manner, the performance of the defroster heater may be appropriately adjusted in response to variances in the supply voltage. The present invention avoids too much or too little heat being supplied, thereby reducing unnecessary energy consumption. See, e.g., page 3, lines 11-25.

The Rejections under 35 U.S.C. § 103

In the Office Action, claims 12, 18, 19 and 26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Zangari et al. reference (U.S. Publication No. 2003/0033822) in view of the Chodacki et al. reference (U.S. Publication No. 2003/0164368). Claims 13-17 and 20-25 rejected under 35 U.S.C. § 103(a) as being unpatentable over the Zangari et al. reference, the Chodacki et al. reference, and further in view of the Hickl et al. reference (U.S. Patent No. 5,416,300).

Applicants respectfully traverse these rejections.

The Rejection over the Zangari et al. reference in view of the Chodacki et al. reference

Claims 12, 18, 19 and 26 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the Zangari et al. reference in view of the Chodacki et al. reference. Applicants respectfully traverse this rejection.

Applicants respectfully submit that none of the applied references discloses or suggests the features of the claimed invention a method for operating a defroster heater

that defrosts an evaporator of a refrigeration device. The method includes recording a voltage amplitude of a supply voltage for the defroster heater, generating a pulsed supply current for the defroster heater, a pulse-duty ratio of the pulsed supply current based upon the recorded voltage amplitude, and supplying the defroster heater with the pulsed supply current, for a fixed heating interval, as recited in independent claim 12.

Applicants respectfully submit that none of the applied references discloses or suggests the features of the claimed invention including a refrigeration device, comprising an integrated defroster heater for defrosting an evaporator, a voltage supply coupled to said defroster heater, a recording circuit coupled to said voltage supply for recording a voltage amplitude supplied to said defroster heater and for generating a control signal having a pulse-duty ratio that is based upon the recorded voltage amplitude, and a circuit breaker activated by said control signal for pulsing a supply current fed to said defroster heater for a fixed heating interval, as recited in independent claim 19.

As explained above, these features are important for controlling a defrost heater with a pulsed supply current having a pulse-duty ratio that is based upon an amplitude of the defroster heater supply voltage. In this manner, the performance of the defroster heater may be appropriately adjusted in response to variances in the supply voltage. The present invention avoids too much or too little heat being supplied, thereby reducing unnecessary energy consumption.

The Zangari et al. reference very clearly does not teach or suggest these features. Indeed, the Office Action specifically acknowledges that the Zangari et al. reference lacks the teaching of generating a pulsed supply current for the defroster heater, a pulse-duty ratio of the pulsed supply current based upon the recorded voltage amplitude, as recited in claim 12, or that the fixed heating interval includes a substantial number of cycles of an alternating current provided by the voltage supply, as recited in claim 18.

The Chodacki et al. reference does not remedy the deficiencies of the Zangari et al. reference.

Applicants respectfully submit that one of ordinary skill in the art would not have combined the Zangari et al. reference and the Chodacki et al. reference as alleged by the Office Action. Indeed, the Examiner may not rely upon the Chodacki et al. reference under 35 U.S.C. § 103 because the Chodacki et al. reference is non-analogous art.

To qualify as analogous art, a reference must either be (1) within the field of Applicants endeavor, or if not, (2) the subject matter logically would have commended itself to an inventor's attention in considering his or her invention as a whole. See M.P.E.P. § 2141.01(a)(I) citing KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385, 1397 (2007).

In the present instance, the Chodacki et al. reference clearly is not within the field of Applicants' endeavor.

The field of Applicants' endeavor is the field of refrigeration devices and, more particularly, a defroster heater that defrosts an evaporator of a refrigeration device. Indeed, the claims very clearly are directed to a "method for operating a defroster heater that defrosts an evaporator of a refrigeration device" and a "refrigeration device."

In stark contrast, the Chodacki et al. reference is within the completely different and unrelated field of electrical resistance igniters for initiating combustion of a fuel air mixture in a cooking range, clothes dryer, heating apparatus, etc. supplied with propane, natural gas, or oil. See para. [0001], [0002], and [0045]-[0048].

The field of endeavor of electrical resistance igniters for initiating combustion of a fuel air mixture clearly is different from the field of endeavor of refrigeration devices and, more particularly, a defroster heater that defrosts an evaporator of a refrigeration device.

For at least the foregoing reasons, the Chodacki et al. reference clearly is not within the field of Applicants' endeavor.

As set forth above, a reference that is not within the field of Applicants endeavor may qualify as analogous art if the subject matter logically would have commended itself to an inventor's attention in considering his or her invention as a whole. See M.P.E.P. §

2141.01(a)(I) citing KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385, 1397 (2007).

In the present instance, the subject matter of the Chodacki et al. reference logically would not have commended itself to an inventor's attention in considering his or her invention as a whole.

Properly considered as a whole, the present invention is directed to a defroster heater that defrosts an evaporator of a refrigeration device that avoids too much or too little heat being supplied, thereby reducing unnecessary energy consumption. See, e.g., page 2, lines 5-18, and page 3, lines 11-25.

In stark contrast, the Chodacki et al. reference very clearly is concerned with the completely unrelated problem of providing an igniter control system 10 that yields a control system that allows a hot surface igniter 20 to be heated up more quickly and thus shorten the ignition time for the heating device or apparatus. This control system, after a predetermined time period has expired, also reduces and regulates the voltage being applied thereafter so the hot surface igniter maintains a fairly consistent operating temperature and so as to not unduly shorten the operational life of the hot surface igniter(s). In further embodiments, the methodology for regulating the voltage also yields a method that provides the least amount of electrical emissions, such that a line filter may not be provided, thereby reducing hardware requirements as well as associated costs such as for manufacturing. See, e.g., para. [0043].

The subject matter of providing a surface igniter 20 that heats up more quickly and thus shortens the ignition time for the heating device or apparatus according to the Chodacki et al. reference logically would not have commended itself to an inventor's attention in considering, as a whole, ways to provide a defroster heater that defrosts an evaporator of a refrigeration device that avoids too much or too little heat being supplied, thereby reducing unnecessary energy consumption. The Chodacki et al. reference has absolutely nothing to do with solving the problem of reducing unnecessary energy consumption for a defroster heater that defrosts an evaporator of a refrigeration device, as in the present invention as a whole.

The surface igniter of the Chodacki et al. reference does not address any need or problem known in the field of defroster heaters, and indeed, clearly would not have commended itself to the attention of the ordinarily skilled artisan looking to solve problems with defroster heaters. Rather, the Chodacki et al. reference very clearly is concerned with the completely unrelated problem of providing a surface igniter that heats up more quickly and thus shortens the ignition time for the heating device or apparatus.

For at least these reasons, the subject matter of the Chodacki et al. reference logically would not have commended itself to an inventor's attention in considering his or her invention as a whole, and therefore, the Chodacki et al. reference does not qualify as analogous art.

Even assuming *arguendo*, that the Chodacki et al. reference would qualify as analogous art, Applicants respectfully submit that one of ordinary skill in the art would not have had an apparent reason to combine the disclosure of the Chodacki et al. reference with disclosure of the Zangari et al. reference to arrive at the claimed invention as a whole. Moreover, the Office Action does not establish an adequate rationale for making such a combination.

The Zangari et al. reference is concerned with providing a frosting cooler that creates and maintains frost on cold products, thereby to provide a visual manifestation of the cold condition of the beverage. See Abstract.

In stark contrast, the Chodacki et al. reference is concerned with the completely different and unrelated problem of providing a surface igniter that heats up more quickly and thus shortens the ignition time for the heating device or apparatus.

One of ordinary skill in the art would not have had an apparent reason to combine the features of a surface igniter that heats up more quickly and thus shortens the ignition time for the heating device or apparatus, as taught by the Chodacki et al. reference, with a frosting cooler that creates and maintains frost on cold products, thereby to provide a visual manifestation of the cold condition of the beverage, as taught by the Zangari et al. reference.

Applicants respectfully submit that none of the applied references discloses or suggests the features of the claimed invention including a method for operating a defroster heater that defrosts an evaporator of a refrigeration device. The method includes recording a voltage amplitude of a supply voltage for the defroster heater, generating a pulsed supply current for the defroster heater, a pulse-duty ratio of the pulsed supply current based upon the recorded voltage amplitude, and supplying the defroster heater with the pulsed supply current, for a fixed heating interval, as recited in independent claim 12.

Applicants also respectfully submit that none of the applied references discloses or suggests the features of the claimed invention including a refrigeration device, comprising an integrated defroster heater for defrosting an evaporator, a voltage supply coupled to said defroster heater, a recording circuit coupled to said voltage supply for recording a voltage amplitude supplied to said defroster heater and for generating a control signal having a pulse-duty ratio that is based upon the recorded voltage amplitude, and a circuit breaker activated by said control signal for pulsing a supply current fed to said defroster heater for a fixed heating interval, as recited in independent claim 19.

As explained above, these features are important for controlling a defrost heater with a pulsed supply current having a pulse-duty ratio that is based upon an amplitude of the defroster heater supply voltage. In this manner, the performance of the defroster heater may be appropriately adjusted in response to variances in the supply voltage. The present invention avoids too much or too little heat being supplied, thereby reducing unnecessary energy consumption.

Applicants respectfully request withdrawal of this rejection.

The Rejection over the Zangari et al. reference, the Chodacki et al. reference, in view of the Hickl et al. reference

Claims 13-17 and 20-25 rejected under 35 U.S.C. § 103(a) as being unpatentable over the Zangari et al. reference, the Chodacki et al. reference, and further in view of the Hickl et al. reference.

Applicants respectfully traverse this rejection.

The Chodacki et al. reference does not remedy the deficiencies of the Zangari et al. reference and the Chodacki et al. reference with respect to independent claims 12 and 19 above.

Applicants respectfully submit that one of ordinary skill in the art would not have combined the Zangari et al. reference, the Chodacki et al. reference, and the Hickl et al. reference as alleged by the Office Action. Indeed, as with the Chodacki et al. reference, the Examiner may not rely upon the Hickl et al. reference under 35 U.S.C. § 103 because the Hickl et al. reference is non-analogous art.

In the present instance, the Hickl et al. reference clearly is not within the field of Applicants' endeavor. As explained above, the field of Applicants' endeavor is the field of refrigeration devices and, more particularly, a defroster heater that defrosts an evaporator of a refrigeration device. Indeed, the claims very clearly are directed to a "method for operating a defroster heater that defrosts an evaporator of a refrigeration device" and a "refrigeration device."

In stark contrast, the Hickl et al. reference is within the completely different and unrelated field of electric igniters for initiating combustion of a fuel air mixture in a burner which produces heat in heating system that uses gas, and particularly to an electric igniter for both a 120 V system and a 230 V system. See col. 1, lines 9-32 and 64-68, and col. 2, lines 1-2.

The field of endeavor of electric igniters for initiating combustion of a fuel air mixture in a burner for both a 120 V system and a 230 V system clearly is different from the field of endeavor of refrigeration devices and, more particularly, a defroster heater that defrosts an evaporator of a refrigeration device.

For at least the foregoing reasons, the Hickl et al. reference clearly is not within the field of Applicants' endeavor.

Moreover, the subject matter of the Hickl et al. reference logically would not have commended itself to an inventor's attention in considering his or her invention as a whole.

As explained above, properly considered as a whole, the present invention is directed to a defroster heater that defrosts an evaporator of a refrigeration device that avoids too much or too little heat being supplied, thereby reducing unnecessary energy consumption. See, e.g., page 2, lines 5-18, and page 3, lines 11-25.

In stark contrast, the Hickl et al. reference very clearly is concerned with the completely unrelated problem of providing an electric igniter for initiating combustion of a fuel air mixture in a burner for both a 120 V system and a 230 V system.

The subject matter of providing an electric igniter for both a 120 V system and a 230 V system according to the Hickl et al. reference logically would not have commended itself to an inventor's attention in considering, as a whole, ways to provide a defroster heater that defrosts an evaporator of a refrigeration device that avoids too much or too little heat being supplied, thereby reducing unnecessary energy consumption. The Hickl et al. reference has absolutely nothing to do with solving the problem of reducing unnecessary energy consumption for a defroster heater that defrosts an evaporator of a refrigeration device, as in the present invention as a whole.

For at least these reasons, the subject matter of the Hickl et al. reference logically would not have commended itself to an inventor's attention in considering his or her invention as a whole, and therefore, the Hickl et al. reference does not qualify as analogous art.

Even assuming *arguendo*, that the Hickl et al. reference would qualify as analogous art, Applicants respectfully submit that one of ordinary skill in the art would not have had an apparent reason to combine the disclosure of the Hickl et al. reference with the disclosure of the Zangari et al. reference and the Chodacki et al. reference to

arrive at the claimed invention as a whole. Moreover, the Office Action does not establish an adequate rationale for making such a combination.

The Zangari et al. reference is concerned with providing a frosting cooler that creates and maintains frost on cold products, thereby to provide a visual manifestation of the cold condition of the beverage. See Abstract.

In stark contrast, the Hickl et al. reference is concerned with the completely different and unrelated field of electric igniters for initiating combustion of a fuel air mixture in a burner which produces heat in heating system that uses gas, and particularly to an electric igniter for both a 120 V system and a 230 V system.

One of ordinary skill in the art would not have had an apparent reason to combine the features of an electric igniter for initiating combustion of a fuel air mixture in a burner which produces heat in heating system that uses gas for both a 120 V system and a 230 V system, as taught by the Hickl et al. reference, with a frosting cooler that creates and maintains frost on cold products, thereby to provide a visual manifestation of the cold condition of the beverage, as taught by the Zangari et al. reference.

Applicants respectfully request withdrawal of these rejections.

CONCLUSION

In view of the above, entry of the present Amendment and allowance of Claims 12-26 are respectfully requested. If the Examiner has any questions regarding this amendment, the Examiner is requested to contact the undersigned. If an extension of time for this paper is required, petition for extension is herewith made.

Respectfully submitted,

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June 2, 2009

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